

First record of *Flabellina dana* Millen and Hamann, 2006 (Mollusca: Nudibranchia) in the South Atlantic Ocean

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ABSTRACT: The nudibranch *Flabellina dana* Millen and Hamann, 2006 is reported from two localities in the northeastern Brazilian coast. These are the first records of this species, previously recorded from localities in the Bahamas and the Caribbean Sea, in South Atlantic Ocean, extending its known geographic distribution more than 3500 km southward.

Nudibranchia comprehends around 3000 marine gastropod species highly diverse in morphological, ecological and biological aspects. Nudibranchs lack the shell in adult forms, are hermaphrodite and most species are carnivorous, feeding on other marine invertebrates, mainly sponges. It is the richest group within Opisthobranchia, with approximately half of the total number of species (Behrens 2005; Wagële and Klussman-Kolb 2005).

So far, around 100 nudibranch species were reported to Brazil (DaCosta *et al.* 2010), a small number if compared to more studied places and even the Caribbean Sea (191 species, Valdés *et al.* 2006). In Brazil, most studies were carried out during three decades, ranging from 1955 to 1983 by the German couple Ernst and Eveline Marcus (Marcus 1955; Marcus 1970; Marcus 1983). Recently, new species were discovered and described from Brazil (DaCosta *et al.* 2010; Padula and Delgado 2010; Alvim *et al.* 2011) indicating that the diversity is clearly underestimated.

Among nudibranchs, *Flabellina* Voigt, 1834 is characterized by a triseriate radula with denticulate rachidian teeth; strong jaws; presence of corners on the foot (propodial tentacles); grouped cerata and pleuroproctus anus (Millen and Hermosillo 2007). The genus has over 54 species distributed in temperate and tropical seas (Millen and Hamann 2006). In Brazil, only four species are known: *Flabellina dushia* (Marcus and Marcus, 1963) from the region of Búzios, Rio de Janeiro state (García García *et al.* 2008); *Flabellina engeli* Marcus and Marcus, 1968 known from Cabo Frio and Arraial do Cabo, Rio de Janeiro state to Arvoredo, Santa Catarina state (DaCosta *et al.* 2007); *Flabellina verta* (Marcus, 1970) from Cananéia, São Paulo state (García García *et al.* 2008; Rios 2009) and *Flabellina marcusorum* Gosliner and Kuzirian, 1990 from Santos Bay, São Paulo state (García García *et al.* 2008; Rios 2009).

This work reports for the first time the occurrence of *Flabellina dana* Millen and Hamann, 2006 in the Brazilian

coast, South Atlantic Ocean. This species was previously recorded in the Caribbean Sea, more exactly in St. Lucia (type locality), Curaçao, Costa Rica and also in the island of Abaco, Bahamas (Figure 1) (Redfern, 2001; Millen and Hamann 2006; Valdés *et al.* 2006).

The collected and examined material is deposited in the malacological collection of the Museu de Zoologia of the Universidade de São Paulo (MZSP). Specimens were collected through snorkeling in Santa Rita beach, Extremoz, Rio Grande do Norte state (RN) (05°41'41" S, 35°11'58" W) on August 2009 (MZSP 99636) (Figure 2B) and in Barra beach, Salvador, Bahia state (BA) (13°00'37" S, 38°31'49" W) on January 2010 (MZSP 96480) (Figure 2A and 2C). The specimen from Bahia (MZSP 96480) was photographed *in situ* (Figure 2A).

Order Nudibranchia Blainville, 1814

Family Flabellinidae Bergh, 1889

Flabellina dana Millen and Hamann, 2006

Description: long and extremely slender body, specimens length 6,0 mm (MZSP 99636) and 7,0 mm (MZSP 96480). Bilabiate foot with long propodial tentacles and tapered posterior end. Oval head as wide as foot. Mouth with vertical aperture. Oral tentacles smooth, length corresponding to approximately 1/5 of the total body length. Annulate and wide rhinophores with pointed tip, each rhinophore with up to eight wide and spaced rings. Eyes situated laterally on the head just below the basis of each rhinophore. Cerata latero-dorsally positioned, arranged in five to six paired groups along the body length. Pair of pre-cardiac groups with five to six ceratas, post-cardiac groups decreasing in number of cerata towards distal end. Translucid white body with a longitudinal dorsal white line. Body sides opaque white. Cerata red with white cnidosacs. Rhinophores opaque white except for their translucid basis (Figure 2).

The specimens found in Brazil are consistent with the

original description of *F. dana* (Millen and Hamann 2006) and additional works (Redfern, 2001, as *Flabellina* sp. A; Valdés *et al.* 2006, as *Flabellina* sp. 3), based on material from the Bahamas and the Caribbean Sea. As the species is easily recognized by its external morphology, with specific characteristics such as the annulate rhinophores, the small specimens herein studied were not dissected to preserve its morphology and were deposited intact in the collection. Our records from Brazil extend the known geographic distribution of the species more than 3500 km southward, in the South Atlantic Ocean.

Among the Flabellinidae the species that most resembles *F. dana* is *F. dushia*. Some common characteristics are the opaque white color on the head, oral tentacles and most of the dorsum; the foot bilabiate and notched with long propodial tentacles; the pleuroproctus anus, posterior to inter-hepatic space; and the renal and genital opening location. However, the two species can be easily morphologically differentiated due to characteristics in the head, mouth and rhinophores. *Flabellina dushia* presents rounded head, terminal and triangular mouth and smooth rhinophores, while *F. dana* has oval head, vertical and sub-terminal mouth and annulate rhinophores (Millen and Hamann 2006; Valdés *et al.* 2006). The rhinophore is an important diagnostic characteristic of *F. dana*. It is the only known western Atlantic Flabellinidae with annulate rhinophores (Figure 2C) (Millen and Hamann, 2006).



FIGURE 1. Geographic distribution of *Flabellina dana*. Previous records (circles): 1. Bahamas; 2. St. Lucia (type locality); 3. Curaçao and 4. Costa Rica (Valdés *et al.* 2006). New records (squares): 5. Rio Grande do Norte and 6. Bahia, Brazilian northeastern coast.

Species distribution ranging from the Caribbean Sea as far as the Brazilian coast is not novelty among marine organisms, with examples in cnidarians (Neves *et al.* 2006; Neves *et al.* 2008; Neves *et al.* 2010) and reef fishes (Floeter *et al.* 2001; Joyeux *et al.* 2001; Rocha *et al.* 2005; Floeter *et al.* 2008; Olavo *et al.* 2011). Concerning nudibranchs, the similarity between the Brazilian and Caribbean fauna has been reported since 1970's (Marcus 1970; Marcus and Marcus 1970; Padula and Santos 2006). *Flabellina dana* is one more species in common between these two regions, being the present records important additions to the little known nudibranch biodiversity in northeastern Brazil.

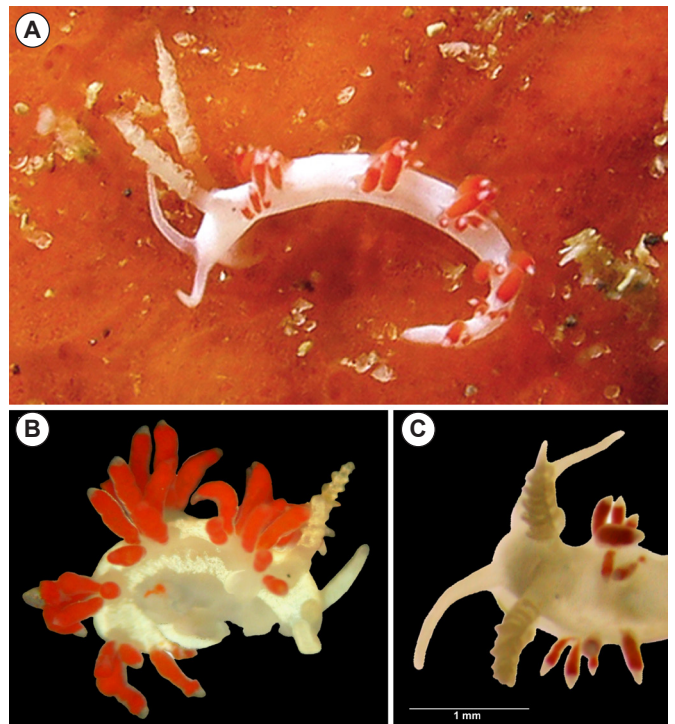


FIGURE 2. *Flabellina dana*, specimens from Rio Grande do Norte and Bahia, northeastern Brazil. A. Specimen *in situ* from Salvador, Bahia State (7 mm long); B. Specimen from Extremoz, Rio Grande do Norte State (6 mm long); C. Detail of the annulate rhinophores of the specimen from Salvador.

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